# Synthesis, crystal structure and magnetic properties of new copper(II) complexes based on 3-(2-pyridyl)-1,2,4-triazole.

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Streszczenie

The synthesis, crystal structure, spectroscopic and magnetic properties of binuclear $[Cu_2(L)_2(SO_4)(H_2O)_3]\cdot 3H_2O$ (**4a**) and tetranuclear $[Cu_4(HL)_2(L)_4(DMF)_2(SO_4)_2]\cdot DMF$ (**4b**) copper(II) complexes were reported (where HL is 3-(pyridine-2-yl)-1,2,4-triazole). Potentiometric titrations, ESI-MS and spectrophotometric studies of complex formation in $MeOH/H_2O$ solutions indicated the presence of monomeric $[CuHL]^{2+}$, dinuclear $[Cu_2L_2]^{2+}$ and $[Cu_2L_2(OH)]^{+}$, and trinuclear $[Cu_2L_3]^{+}$ and $[Cu_2L_3(OH)]$ species. The small N,N-nucleating ligand HL leads to a supramolecular formation of the complexes. The ligand comprises a triazole moiety substituted by pyridine group, strategically located to form chelate metalocycles. The basis of both complexes is two metal centres bridged via $N_1$–$N_2$ diazine grouping of a triazole ring. For complex **4b** two HL coordinate in acidoform via $N_{Py}$ and $N_4$ of azole moiety as well. There are significant differences in the polyhedrons, namely nuclearity and Cu…Cu separations. Complexes were characterized by elemental analysis, mass-spectrometry, IR-spectroscopy and X-ray analysis. Magnetic measurements revealed that both compounds exhibit antiferromagnetic interaction. The magnetic susceptibility data were interpreted on the basis of the spin Hamiltonian in the temperature range (2–300K) using the dinuclear ( **4a:** $J_1$=−52.41cm$^{-1}$) and tetranuclear (**4b:** $J_1$=−53.10cm$^{-1}$ to $J_2$=−0.14cm$^{-1}$) models.

Słowa kluczowe

atom, molecule, 4-Triazole, Copper(II) complex, Tetranuclear supramolecular associate, Crystallographic data, magnetic properties, Potentiometric titrations

Adres publiczny

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